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4. Remarks on the Numbers and on the Phylogenetic Development of the Remiges of Birds. By HANS GADOW, Ph.D., M.A., F.Z.S., Strickland Curator and Lecturer on the Advanced Morphology of Vertebrata in the University of Cambridge.

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PART I.

The number and size of the primaries or metacarpo-digital quills have been examined by various ornithologists (Coues, Gerbe, Jeffries, Wallace¹), and have often been used as taxonomic characters,

¹ *Principal Literature referred to in this Paper.*

NITZSCH, C. L. *System der Pterylographie.* Halle, 1840.

SUNDEVALL, C. J. "On the Wings of Birds." *Ibis*, 1886, pp. 389-457. Translated from the Swedish original in *Kongl. Vetenskaps-Akad. Handlingar*, 1843.

WALLACE, A. R. "On the Arrangement of the Families constituting the order Passeres." *Ibis*, 1874, pp. 406-416.

especially in the Order of Passeres. The statements hitherto published are, however, not always in harmony with each other, and moreover are not free from mistakes.

Considering that the results yielded by a renewed and more comprehensive examination of the points in question may possibly influence the systematic position of some genera or even subfamilies, I submit the following tables (pp. 658-664) for the acceptance of the Zoological Society of London. They contain the results of some investigations which I have recently made. Many of the specimens examined were fresh or had been preserved in spirits. Of many species several specimens have been examined, in order to exclude doubt, which occasionally arises, in the cases of moulting or imperfect or very small birds.

The remarks which I have to offer are scanty, not only because the whole matter is rather dry, but because I have abstained from testing the taxonomic value of the arrangement of the terminal primaries by correlating their features with other known characters. At any rate the following tables show such considerable variations of the terminal quills within the limits of avowedly closely allied genera and subfamilies, that we ought to refrain from generalizations. The same remark applies to the presence or absence of the fifth cubital quill. Although this character was discovered by Gerbe in 1877, and has lately been rediscovered by Wray, it remains still unexplained, young birds not throwing any light upon the question. The presence of this fifth quill is indicated by a +, its absence by a — in the accompanying tables. The other columns contain the total number of primaries, and the way in which this number is composed of metacarpal and the various digital quills.

The most important result is evidence of the gradual reduction in number of the functional quills. With the exception of *Struthio* and the Spheniseidæ, the number of primaries or metacarpodigital quills varies between 12 and 10. Amongst the birds which possess 12 primaries, the Podicipedidæ, many Pelargi, and *Rheu* possess 7 metacarpal and 5 digital quills, whilst *Apteryx* has 8 metacarpal and only 4 digital quills. In all other birds the reduction from 12 to 11 is due to the reduction from 7 to 6 of the metacarpal quills. *Abdimia* stands alone with 7 metacarpals, and only one quill carried by the second phalanx of the second digit. The 11th or terminal quill is never fully developed and hardly functional; it is invariably much shortened, and is hidden between its upper and lower covert; not

COUES, E. "On the Number of the Primaries in Oscines." Bull. Nuttall Ornith. Club, i. (1876), pp. 60-63.

GERBE, Z. "Sur les plumes du vol et leur mue." Bull. Soc. Zool. France, ii. (1877), pp. 289-290.

JEFFRIES, J. A. "On the Number of Primaries in Birds." Bull. Nuttall Ornith. Club, vi. (1881), pp. 6-11.

WRAY, R. S. "On some Points in the Morphology of the Wings of Birds." Proc. Zool. Soc. 1887, pp. 343-357.

FUERBRINGER, M. Untersuchungen zur Morphologie und Systematik der Vögel. Amsterdam, 4^o, 1888.

BAIRD. Review of North-American Birds.

unfrequently it is shorter and weaker than its upper, often very stiff covert. In some birds, *e. g.* in certain Fulicariæ and in the Passeres, the 11th quill is very tiny indeed, or it is altogether absent. In this case, however, the upper covert is present as an apparently supernumerary feather, provided that the 10th quill is not likewise much reduced. The 10th primary shows every intermediate stage between the largest possible development, as in *Larus* and *Cypselus*, and a very degenerate condition, as in many of the so-called Oscines novempennatæ. In the latter birds it was first properly recognized as a true primary by Baird, in his 'Review of American Birds.' In all cases the reduction from 11 to 10 primaries is brought about by the reduction at the terminal end of the wing.

The reduced terminal quill occasionally assumes the shape and coloration of its lower covert, and does not agree with the other primaries nor with its upper covert, as one might be predisposed to think would be the case. In *Neophron percnopterus*, for instance, the 11th quill is more than 4 centim. long and quite white like the lower wing-coverts, not black like the upper coverts and the other primaries. The same is the case with *Grus leucogeranus*. The terminal or 11th quill of *Oriolus* is very small, and yellow like the lower wing-coverts. In *Rupicola* it is very tiny, reddish like the lower coverts, and hidden by a very stiff upper covert of 4 centim. in length. This is one of many cases in which the 11th upper covert is longer and much stronger than its primary quill, so that it even acts as a substitute for the latter.

Passeres.

It is hardly necessary to mention that there are numerous transitional stages which connect the four groups A, B, C, D into which Wallace has divided the Passeres. There can be no doubt about the fact that the reduction of the 9th and 10th primaries has taken place in the various families independently; identical conditions of the terminal quills do not therefore necessarily indicate relationship. Some Alaudidæ belong to Group D according to the state of their primaries; *Lanius minor* differs strikingly from all the other Laniinæ. The Vireoninæ are probably now in an unsettled state, to judge from the variable relative size of their terminal quills. *Heteralocha* does not agree with the Sturnidæ.

The gradual diminution of the 10th primary can well be studied in Group D.

In some cases there might be some doubt whether the little terminal feather in question is in reality a primary, but this can easily be settled by the presence of the corresponding upper covert. Moreover there are many cases in which this primary is still longer than its covert. When the 10th or 11th quill is much shortened, the corresponding lower covert is absent in the Passeres. The Alaudidæ prove that the 10th quill is capable of being shifted dorsalwards, so that it becomes enclosed between the outer vane of the 9th primary and the 10th upper covert, instead of being situated freely visible below and in front of the 9th primary; when seen from below, it is

| | | Total No. of Primaries. | Metacarpals. | Dig. III. | Ph. I. Dig. II. | Ph. I. Dig. II. | Ph. II. Dig. II. | Ph. II. Dig. II. | Vth. Cubital. | |
|----------------------|----------------------------|-------------------------|--------------|-----------|-----------------|-----------------|------------------|------------------|---------------|--|
| Ratitæ | <i>Dromæus</i> | 12 | 7? | 1 | 1 | 1 | 1 | 1 | | <i>Casuarus bennetti</i> has only 7 remiges in all, of which 5 are secondaries and 2 metacarpals. I am indebted for a sketch of the wing of this bird to Mr. R. S. Wray. |
| | <i>Struthio</i> | 16 | 8 | 1 | 1 | 2 | 1 | 1 | | |
| | <i>Rbea</i> | 12 | 7 | 1 | 1 | 1 | 1 | 1 | | |
| | <i>Apteryx</i> | 12 | 8 | 1 | 1 | 1 | 1 | 1 | | |
| | | 36 | | 1 | 1 | 1 | 1 | 1 | | |
| Spheniscidæ | | 11 | 6 | 1 | 1 | 1 | 1 | 1 | | |
| Lamellirostres | | 11 | 6 | 1 | 1 | 1 | 1 | 1 | | |
| Colymbidæ | | 12 | 7 | 1 | 1 | 1 | 1 | 1 | | |
| Podicipedidæ | | 11 | 6 | 1 | 1 | 1 | 1 | 1 | | |
| Steganopodes | | 11 | 6 | 1 | 1 | 1 | 1 | 1 | | |
| Tubinaries | | 11 | 6 | 1 | 1 | 1 | 1 | 1 | | |
| Iherodii | <i>Ardea</i> | 11 | 6 | 1 | 1 | 1 | 1 | 1 | | |
| | <i>Nycticorax</i> | 11 | 6 | 1 | 1 | 1 | 1 | 1 | | |
| | <i>Scopus</i> | 10 | 6 | 1 | 1 | 1 | 1 | 1 | | |
| | <i>Ibis</i> | 11 | 6 | 1 | 1 | 1 | 1 | 1 | | |
| | <i>Platalea</i> | 11 | 6 | 1 | 1 | 1 | 1 | 1 | | |
| | <i>Coconia alba</i> | 11 | 6 | 1 | 1 | 1 | 1 | 1 | | |
| | <i>Abdimia</i> | 11 | 7 | 1 | 1 | 1 | 1 | 1 | | |
| | <i>Mycteria</i> | 12 | 7 | 1 | 1 | 1 | 1 | 1 | | |
| | <i>Leptoptilus</i> | 12 | 7 | 1 | 1 | 1 | 1 | 1 | | |
| | <i>Anastomus</i> | 12 | 7 | 1 | 1 | 1 | 1 | 1 | | |
| | <i>Tantalus</i> | 12 | 7 | 1 | 1 | 1 | 1 | 1 | | |
| | <i>Phœnicopterus</i> | 12 | 7 | 1 | 1 | 1 | 1 | 1 | | |
| | | 11 | 6 | 1 | 1 | 1 | 1 | 1 | | |
| Laro-Limicolæ | <i>Grus</i> | 11 | 6 | 1 | 1 | 1 | 1 | 1 | | |
| | <i>Aramus</i> | 11 | 6 | 1 | 1 | 1 | 1 | 1 | | |
| | <i>Psophia</i> | 10 | 6 | 1 | 1 | 1 | 1 | 1 | | |
| | <i>Dirololophus</i> | 10 | 6 | 1 | 1 | 1 | 1 | 1 | | |
| | <i>Eurypyga</i> | 10 | 6 | 1 | 1 | 1 | 1 | 1 | | |
| | <i>Rhinocetus</i> | 10 | 6 | 1 | 1 | 1 | 1 | 1 | | |
| | <i>Fulica</i> | 11 | 6 | 1 | 1 | 1 | 1 | 1 | | |
| | <i>Porphyrio</i> | 11 | 6 | 1 | 1 | 1 | 1 | 1 | | |
| | <i>Gallinula</i> | 11 | 6 | 1 | 1 | 1 | 1 | 1 | | |
| | <i>Podica</i> | 10 (11) | 6 | 1 | 1 | 1 | 1 | 1 | | |
| | <i>Crex</i> | 11 | 6 | 1 | 1 | 1 | 1 | 1 | | |

XI. very tiny, soft and occult.
 XI. very small and soft.
 XI. very small.

hidden by the outer vane of the 9th primary. This shifting explains the conditions which are the rule amongst the birds of Group D. The 11th primary undergoes a similar dislocation in a more marked degree.

Group A.—With 10 long primaries. The 10th quill is, with few exceptions (e. g. *Hylactes*), very little shortened, and partakes of the formation of the tip of the wing. The 11th quill is frequently present, although small and hidden. When it is absent, at least its upper covert is present as a stiff and well-developed little feather.

To this group belong all the Passeres non-oscines.

| | | XIth quill. | | | |
|----------------------|--------------------|------------------|--|--|--|
| I. PSEUDOSCINES ... | Menura | 1.5 cm. long. | } Wings rounded off; the 11th quill and its upper covert are soft and broad. | | |
| | Atrichia | Very small. | | | |
| II. DESMODACTYLI... | Eurylæmus | + | | | |
| | Calyptomena..... | - | | | |
| III. OLIGOMYODI ... | Pitta | - | | | |
| | Philepitta | - | | | |
| | Xenicus | ? | | | |
| | Pipra | } | + | (1) <i>Rupicola</i> , ♂. The 10th primary is somewhat shortened and suddenly narrowed near its end. | |
| | Rupicola (1) | | | | |
| | Tityra (2) | | | | |
| | Metopia | | | | |
| | Querula | | | | |
| | Xipholena | } | - | (2) <i>Tityra</i> , ♂. The 9th primary is much narrowed, and considerably shorter than either the 10th or 8th. In <i>T. brasiliensis</i> it is only half the length of the neighbouring quills. Young males and females have their quills regularly developed. | |
| | Cotinga | | | | |
| | Pyroderus | | | | |
| | IV. TRACIEOPHONÆ | Hadrostomus..... | } | - | (3) <i>Phænicocercus</i> , ♂. The 7th primary is suddenly narrowed at its distal portion, and considerably shorter than the neighbouring quills. |
| | | Lipaugus | | | |
| Ampelion | | | | | |
| Phibalura | | | | | |
| Phænicocercus (3)... | | | | | |
| Phytotoma..... | | | | | |
| Tyrannus | | | | | |
| Milvulus..... | | | | | |
| Pitangus..... | | | | | |
| Formicariidæ..... | | } | | | |
| Furnariidæ | | | | | |
| Pteroptochidæ (4)... | | | | | |
| Dendrocolaptidæ ... | | | | | |
| Conopophagidæ..... | } | - | | | |

Group B.—With 10 distinct, functional primaries. The 10th is always considerably shortened and, as a rule, hardly reaches to one third towards the tip of the wing, rarely halfway towards the tip, as in the *Corvidæ*.

A small 11th quill is frequently present, but almost invariably hidden between its upper covert and the 10th primary. Where the 11th quill is absent, its covert is not always present. This indicates a further reduction of the quills in comparison with the wing of the non-oscine Passeres.

To this group belongs the majority of the so-called Oscines decempennatæ, which correspond with Wallace's series of Typical or Turdoid Passeres.

| | | XIth prim. | Xth upper covert. | Size of the terminal primary. | | |
|--------------------------|-----------------------------|------------|-------------------|---|--|------------------------------------|
| Corvidæ | <i>Fregilus</i> | } | + | 1·7 cm. long. | | |
| | <i>Monedula</i> | | | About 1·2 cm. long. | | |
| | <i>Corvus</i> | | | | | |
| | <i>Gymnorhina</i> | | | | | |
| | <i>Strepera</i> | | | | In <i>Strepera</i> 1·2 cm. long, and somewhat shorter than its upper covert. | |
| Oriolidæ | <i>Cracticus</i> | } | + | | In <i>Cracticus</i> and <i>Gymnorhina</i> very small and occult. | |
| | <i>Manucodia</i> | | | | | |
| | <i>Garrulus</i> | | | | | |
| | <i>Cyanocitta</i> | | | | | |
| | <i>Oriolus</i> | | | | | |
| Dieruridæ | | } | + | Very tiny, shorter than its upper covert. | | |
| | <i>Sphecotheses</i> | | | | | |
| Prionopidæ | <i>Mimeta</i> | } | + | | | |
| | | | | | | |
| Dieruridæ | <i>Collyriocincla</i> | - | - | | | |
| Prionopidæ | <i>Euryceros</i> | - | - | | | |
| Campophagidæ | <i>Graucalus</i> | + | + | | | |
| Turdidæ | <i>Sylvia</i> | } | - | | | |
| | <i>Turdus</i> | | | | | |
| | <i>Saxicola</i> | | | | | |
| Muscicapidæ | <i>Malurus</i> | - | + | | | |
| Timeliidæ | <i>Hypsipetes</i> | - | + | | | |
| | <i>Pycnonotus</i> | } | + | In <i>P. layardi</i> 1 cm., in other species often short. | | |
| | <i>Pomatorhinus</i> | | | | | |
| | <i>Malacocercus</i> | | | In <i>Pomatorhinus</i> and <i>Malacocercus</i> more than 1 cm. in length. | | |
| | <i>Phyllorhis</i> | | | | | |
| | <i>Crateropus</i> | | | } | + | Upper 11th covert extremely small. |
| | <i>Liothrix</i> | | | | | |
| | <i>Accentor</i> | | | | | |
| <i>Sialia</i> | } | | | - | - | |
| <i>Troglodytes</i> | | | | | | |
| <i>Cinclus</i> | | | | | | |

Group B (continued).

| | | XIth prim. | Xth upper covert. | Size of the terminal primary. |
|--------------------|---------------------------|------------|-------------------|---|
| Paridæ | Parus | } | - | 10th primary of <i>Chamæa</i> more than 3 cm. in length. |
| | Ægithalus | | | |
| | Chamæa | | | |
| | Parisoma | | | |
| | Certhiparus | | | |
| | Orthonyx | | | |
| Laniidæ | <i>Vireoninæ.</i> | } | - | The size of the 10th primary varies very much. In <i>Cyclorhis</i> it is reduced to only one half of the length of the 9th; in <i>Vireo solitaria</i> it is hardly 2 cm. long, whilst in <i>Vireosylvia</i> it is frequently reduced to a small, pointed feather of 1 cm. in length. |
| | Cyclorhis | | | |
| | Vireo | | | |
| | Vireosylvia | | | |
| | <i>Pachycephalinæ.</i> | } | - | <i>Eopsaltria</i> seems occasionally to possess an upper 11th covert. |
| | Pachycephala | | | |
| | Falcunculus | | | |
| | Oreoica | | | |
| | Eopsaltria | | | |
| | <i>Laniinæ.</i> | } | + | The 11th primary is very distinct; only in <i>L. minor</i> it is absent, but its upper covert is present. In <i>L. minor</i> alone the 10th primary is much shortened, and the tip of the wing is formed by the 9th. All the other Laniinæ have rounded-off wings, and the 10th primary is $\frac{1}{3}$ – $\frac{1}{2}$ the length of the 9th. |
| | Lanius | | | |
| | Urolestes | | | |
| | Laniarius | | | |
| | Telophonus | | | |
| | | - | -? | |
| Certhiomorphæ..... | Certhia | - | -? | |
| | Climacteris | - | + | |
| | Sitta | - | - | |
| Cinnyrimorphæ ... | <i>Nectariniidæ</i> | + | - | Including <i>Promerops</i> . |
| | <i>Meliphagidæ.</i> | | | The 11th primary is generally very small, its upper covert is perhaps occasionally absent. |
| | Prothemadera | | | |
| | Acanthochæra | | | |
| | Tropidorhynchus ... | | | |
| | Xanthomyza | | | |
| | Ptilotis | | | |
| | Myzomela | | | |

Group C.—Transitional group from B to D, comprising the Sturnoid Passeres of Wallace. The numerous and considerable exceptions destroy the validity of this group. General characters are:—10 distinct primaries; the 9th is long and helps to form the tip of the wing. The 10th primary is considerably shortened. The 11th primary is lost completely, but its upper covert is still present; the latter is, as a rule, very small, except in *Heteralocha*, where it reaches a length of 1.5 centim.

| | | Length of 10th primary in cm. | |
|--------------|-------------------------------|-------------------------------------|--|
| Ploceidæ ... | Textor | 4.2! | The 10th primary in <i>Hyphantornis</i> is 3 times longer than its upper covert. Traces of the 10th primary are present besides a distinct 11th covert. <i>P. manyar</i> , 11th primary twice the length of its covert. |
| | Hyphantornis | 2.5 | |
| | Chera | 2.1 | |
| | Ploceus oryx | 1.2 | |
| | — manyar..... | 1.8 | |
| Sturnidæ ... | Sturnus | 1.5 | Wings much rounded; tips formed by the 5th and 6th quills. |
| | Acridotheres tristis | 2.5 | |
| | Gracula | 3.0 | |
| | Basilornis | 2.5 | |
| | Heteralocha | 9.0! | |
| Artamidæ ... | Artamus..... | 2-2.5 | |
| Alaudidæ ... | Alauda arvensis | 0.8 | } Stiff and not occult, smaller than its covert. |
| | — calaudra | 1.1 | |
| | Otocorys alpestris..... | 0.7 | } Occult, between its covert and the outer vane of the 9th primary. |
| | — bilopha | 0.7 | |
| | Certhilauda bifasciata | 2.3 | } Quite visible, not hidden. |
| | Pyrrhulanda | 1.7 | |
| | Mirafra | 3.0! | |
| | Calandrella brachydactyla ... | 0.8 | With broad and soft vanes, and considerably longer than its covert. Smaller than its covert; shifted dorsally and hidden by the outer vane of the 9th primary. |

Group D.—With only 9 functional primaries. The 9th quill always partakes of the formation of the tip of the wing, and is frequently the largest of all. The 10th quill is, as a rule, reduced to a tiny feather, which is hidden between the 10th covert and outer vane of the 9th quill. This hidden portion is always assumed by the 10th quill, even when it is still tolerably well developed, as in the Hirundinidæ and in the Icteridæ, *i. e.* in birds in which it is stated to be absent by most ornithologists. The 11th upper covert is frequently present.

To this group belong the so-called “Oscines novem-pennatæ,” corresponding with the Tanagroid Passeres of Wallace, and with the section Fringilliformes of the Cat. Birds Brit. Mus.

| | | Length of 10th primary in cm. | | |
|-------------------|-------------------------|-------------------------------------|---|------------------------------------|
| Dicæidæ | Dicæum..... | } very small. | <i>Ampelis</i> with 11th upper covert. <i>Phainopepla</i> ; 10th primary almost $\frac{1}{2}$ the length of the 9th; 10th upper covert absent. | |
| | Pardalotus..... | | | |
| Hirundinidæ ... | Hirundo..... | 1-1.3 | | |
| | Progne | 1.8 | | |
| Ampelidæ | Ampelis | 0.8 | | |
| | Phainopepla nitens] ... | } 1.0 | | |
| Mniotiltidæ | Mniotilta | | | |
| | Dendroæca | | | |
| | Parula | | | |
| | Periglossa | | | |
| | Seiurus | | | |
| Motacillidæ | Motacilla | } 0.8-1.0 | } 10th primary very fine and pointed, of about the same length as its covert. Tip of wing formed by the 9th primary. | |
| | Anthus | | | |
| | Grallina..... | } 2-4.0! | } 10th primary quite free and functional; tips of wing formed by 8th-6th; 11th upper covert present. | |
| | Hemecurus | | | |
| Cœrebidæ | Cœreba | } 0.8-1.0 | | |
| | Diglossa | | | |
| | Drepanis | | | |
| Tanagridæ..... | Tanagra | } 0.8-1.0 | | |
| | Pyranga | | | |
| Icteridæ | Icterus... .. | } 1.3 | | |
| | Cassicus | | | |
| | Quiscalus major | 3.0 | | |
| Fringillidæ | Fringilla cœlebs | 1.0 | | 10th primary very fine and occult. |
| | Coccothraustes | 1.0 | | |
| | Panurus | 1.2 | 10th primary stiff and narrow. | |

PART II.

A few Remarks on the Phylogenetic Development of the Remiges.

Mr. Wray has shown that the one or two rows of greater under wing-coverts, Sundevall's "tectrices aversæ," were originally situated on the dorsal side of the wing, like the remiges themselves, and that the two hinder series of feathers gradually, during the growth of the embryo, are pushed into the ventral side of the wing. This is probably due to the greater development of the remiges proper, and to the formation of the fascia tendinea, which connects the basal portions of all the remiges with each other.

Since this interesting discovery has been made, it is easier to understand the relations between the remiges and greater under wing-coverts in the Ratitæ and Spheniscidæ, and moreover to arrive at a possible explanation of the phylogenesis of the remiges from a general point of view.

Struthio possesses 20–23 cubital and 16 metacarpo-digital remiges. Of the primaries, 8 are carried by the metacarpal bones, one by the remnant of the third finger, 4 by the first, and 3 by the second phalanx of the second finger. There is only one series or row of greater under wing-coverts.

Rhea has only 12 primaries, like certain Carinate birds. The total absence of greater under wing-coverts is probably due to their degeneration.

Spheniscidæ.—Fürbringer draws attention to the fact that in the Spheniscidæ there are more than 30 rows of little scale-like feathers on the dorsal and on the ventral aspect of the wing, *i. e.* a greater number of rows than there are present in any other bird, even all the median, lesser and marginal coverts included. The largest of these feathers are not, like in other birds, the most ulnar series, but the last but one series on the hand, and the second and third last dorsal rows of the forearm. Each of these rows contains 25–27 feathers on the arm, and 35–36 on the hand. Fürbringer rightly hints at two possible explanations of this exceptional condition. Either that the Spheniscidæ have lost all their true primaries, which they possibly originally possessed, and that this row of 36 feathers does not represent primaries at all; or perhaps that only every third feather represents a primary, although now degenerated, whilst the other 24 feathers are modified down-feathers. However, neither of these two assumptions is supported by facts. That the number of feathers in one row amounts to 36, *i. e.* three times the number of primaries of certain other Carinate birds, is most probably an accidental coincidence; otherwise one might assume that of every three feathers of the Penguins, one had become a primary and the other two had been transformed into tectrices aversæ.

I find that in a large specimen of *Aptenodytes pennanti* there are no tectrices aversæ, all the feathers of the ventral aspect of the wing looking ventralwards with their convex surfaces. This circumstance suggests the assumption that in the Penguins no rows of

feathers have been turned ventralwards around the posterior or ulnar margin of the wing, and that these birds have retained a primitive condition. If we mark the last dorsal posterior series of the Penguin's potential primaries with A, then A will in *Struthio* represent the only existing series of greater under coverts, whilst the primaries of *Struthio* have to be marked B. This series B has overgrown the series A, as is already indicated by the fact that in the Penguins the last but one series, viz. B, contains somewhat larger feathers. Lastly, in the majority of Carinatæ A and B represent the larger under coverts, and the series C, *i. e.* the third last of the Penguins, has been developed into the series of primaries, whilst series D forms the upper larger wing-coverts.

This would mean of course that the Penguins retain a condition which in other birds is referred to their embryonic life, whilst *Struthio* represents an intermediate stage, provided, however, that in *Struthio* no secondary reduction from several to one series of under wing-coverts has taken place. Such a reduction I assume in *Rhea*, and likewise in the *Oscines*, which possess only one row of larger under wing-coverts. However, Mr. Wray has shown that *Struthio* shows various conditions which in the Carinatæ are repeated during their embryonic growth only.

Unfortunately, about the embryonic development of the Penguin's wing we know nothing; we cannot explain either the enormous number of series of the wing-feathers nor the number of the feathers in each series; we have to look upon them as the result of special modifications. There is no reason why the skin of the wing should not develop any number of feathers. Concerning the cubital quills, we know that their number increases with the length of the forearm, the additional increase in number taking place in the region of the elbow.

Archæopteryx does not throw much light upon the question. It possessed 6-7 primaries, most of which were carried by the third metacarpal and by the third finger. The number of cubitals was 10.

The first Reptile-like Birds probably possessed a rather uniform covering of feathers on their wings. The feathers of the under surface were soft, more downy, those of the upper surface stronger and smoother. The first feathers which grew out stronger and larger were those on the upper hinder margin of the forearm; this resulted in a protection of the sides of the body, and in the possibility of these feathers being occasionally used as a parachute. Natural selection preserved and improved these advantageous acquisitions, in a similar way as the scales on the hinder margin of the "fins" of Turtles are elongated and flattened out. Later on the elongation and strengthening of the posterior marginal feathers extended over the metacarpus and over the fingers, which at this stage were still free and not ankylosed with each other. If these ancestral birds possessed a cutaneous patagium, this was gradually restricted to the proximal region between arm and trunk, where no remiges are developed. Such a structure might have interfered with the folding-up of the wing.

The first finger had already inherited from the Reptiles a tendency towards shortening; it remained therefore outside the series of the other fingers, and partook of the formation of the wing to a small extent only. The next two metacarpal bones and those of the second finger became elongated and thus anchylosed, because of their contemporary and one-sided use. The other bones of the middle hand and other fingers were reduced in size and number, since the newly gained and much strengthened axis necessitated their presence no longer; moreover a fully developed third, fourth, and fifth finger would have much interfered with the folding of the wing, which is effected by a strong abduction towards the ulnar side. Purely mechanical reasons caused the primaries to grow into quills stronger and larger than the secondaries. In the embryos of many birds the remiges of the forearm appear earlier and for some time grow more rapidly than those of the hand, until they are overtaken by the primaries; thus they still repeat their phylogenetic development.

After the reduction and partial anchylosis of the skeleton of the hand has once taken place it is impossible to redevelop the lost fingers and to free or separate the anchylosed metacarpals again. The wing of the Ratitæ does in no way differ from that of the typical Carinatæ. Fürbringer concludes therefore rightly that the present Ratitæ are the descendants of birds which once possessed the power of flight. Now their remiges are soft, or, as in *Casuaris*, have partly lost their vanes, but such soft quills could never have caused the anchylosis of the hand-skeleton. The relatively very considerable size of the whole anterior extremity of Ostrich embryos is an additional support to this view. In a similar way the length of the humerus of the Eocene *Palæudyptes* is a weighty reason against the separation of the Penguins from the other Carinatæ.

APPENDIX.

LIST OF ADDITIONS TO THE SOCIETY'S MENAGERIE

DURING THE YEAR

1888.

- Jan. 2. 1 Vulpine Phalanger (*Phalangista vulpina*), ♀. Born in the Menagerie.
1 Naked-footed Owlet (*Athene noctua*). Presented by the Rev. Basil Wilberforce.
9. 1 Water-Rail (*Rallus aquaticus*). Presented by Mr. G. J. Payne.
11. 1 Egyptian Vulture (*Neophron percnopterus*). Received in Exchange.
12. 1 Mexican Deer (*Cariacus mexicanus*), ♀. Presented by George Anderson, Esq.
13. 2 Common Peafowl (*Pavo cristatus*), 2 ♀. Presented by Richard Hunter, Esq.
14. 2 Black-headed Gulls (*Larus ridibundus*). Presented by Thomas A. Cotton, Esq.
17. 2 Viscachas (*Lagostomus trichodactylus*). Born in the Menagerie.
2 Snow-Finches (*Montifringilla nivalis*). Presented by Lord Lilford, F.Z.S.
2 Cockateels (*Culopsitta novæ-hollandicæ*). Presented by the Hon. Stormont Finch-Hatton.
2 Pale-headed Parrakeets (*Platycercus pallidiceps*). Presented by the Hon. Stormont Finch-Hatton.
18. 4 Barbary Turtle-Doves (*Turtur risorius*). Presented by John Biehl, Esq.
1 Moorish Gecko (*Tarentola mauritanica*). Presented by J. C. Warburg, Esq.
19. 2 Herring-Gulls (*Larus argentatus*). Presented by Thomas A. Cotton, Esq.
20. 1 African Buzzard (*Buteo desertorum*). Presented by Sydney H. Carr, Esq.
22. 1 Common Barn-Owl (*Strix flammea*). Presented by Hugh Bromley, Esq.
23. 1 Vulpine Phalanger (*Phalangista vulpina*), ♂. Born in the Menagerie.
25. 3 Egyptian Cobras (*Naia haje*). Presented by Capt. W. G. Burrows.

- Jan. 25. 3 Cerastes Vipers (*Vipera cerastes*). Presented by Capt. W. G. Burrows.
 2 Hissing Sand-Snakes (*Psammodromis sibilans*). Presented by Capt. W. G. Burrows.
 1 Clifford's Snake (*Zamenis cliffordi*). Presented by Capt. W. G. Burrows.
 1 Egyptian Eryx (*Eryx jaculus*). Presented by Capt. W. G. Burrows.
 1 Blunt-nosed Snake (*Dipsas obtusa*). Presented by Capt. W. G. Burrows.
 21 Horrid Rattlesnakes (*Crotalus horridus*). Born in the Menagerie.
26. 2 Poë Honey-eaters (*Prothemadera novæ-zelandiæ*). Presented by Capt. Brabazon J. Barlow, s.s. 'Tanui.'
27. 1 Brazilian Hangnest (*Icterus jamaicai*). Presented by George D. Morce, Esq.
28. 1 White-headed Sea-Eagle (*Haliaeetus leucocephalus*, jr.). Presented by George M. Johnston, Esq. From Newfoundland.
29. 1 Pike (*Esox lucius*). Presented by F. Godden, Esq., F.Z.S.
- Feb. 2. 1 Fulmar (*Fulmarus glacialis*). Presented by H. M. Upcher, Esq., F.Z.S. From the coast of Norfolk.
 1 Jardine's Parrot (*Pæocephalus gularis*). Received in Exchange.
4. 1 Red-winged Parrakeet (*Aprosmictus erythropterus*). Presented by the Hon. Stormont Finch-Hatton.
 8 Peaceful Doves (*Geopelia tranquilla*). Presented by the Hon. Stormont Finch-Hatton.
6. 2 Cockateels (*Calopsitta novæ-hollandiæ*). Deposited.
 1 Pluto Monkey (*Cercopithecus pluto*). Received in Exchange.
 1 Antarctic Skua (*Stercorarius antarcticus*). Received in Exchange.
7. 1 Indian Desert Fox (*Canis leucopus*), ♀. Deposited. See P. Z. S. 1888, p. 140. From Bussorah.
10. 1 Common Boa (*Boa constrictor*). Presented by Leopold Field, Esq.
 1 Royal Python (*Python regius*). Presented by Leopold Field, Esq.
 1 Indian Python (*Python molurus*). Presented by Leopold Field, Esq.
 2 West-African Pythons (*Python sebæ*). Presented by Leopold Field, Esq.
13. 1 Bonnet-Monkey (*Macacus sinicus*), ♀. Presented by H. Austin Clow, Esq., F.Z.S.
 2 Rhesus Monkeys (*Macacus rhesus*), 2 ♀. Presented by H. Austin Clow, Esq., F.Z.S.
 1 Alpine Marmot (*Arctomys marmotta*), ♀. Presented by H. Austin Clow, Esq., F.Z.S.
 1 Vulpine Phalanger (*Phalangista vulpina*), ♂. Presented by H. Austin Clow, Esq., F.Z.S.
14. 2 Common Gulls (*Larus canus*). Purchased.
 1 Black-headed Gull (*Larus ridibundus*). Purchased.
15. 3 Esquimaux Dogs (*Canis familiaris*). Presented by W. T. Tournay, Esq., F.Z.S.
 4 Parrot Finches (*Erythrura psittacca*). Purchased. See P. Z. S. 1888, p. 140.

- Feb. 15. 4 Alpine Accentors (*Accentor alpinus*). Presented by the Lord Lilford, F.Z.S.
16. 3 Derbian Wallabies (*Halmaturus derbianus*). Presented by Lieut. C. M. Hepworth, R.N.R.
- 4 Cereopsis Geese (*Cereopsis novæ-zealandiæ*). Bred in the Menagerie.
17. 4 Lion Marmosets (*Midas rosalia*). Purchased.
- 1 Eyra (*Felis eyra*). Purchased.
18. 1 Cardinal Grosbeak (*Cardinalis virginianus*). Presented by Mr. Ayerst.
21. 1 Common Wolf (*Canis lupus*), ♀. Received in Exchange.
- 2 Suricates (*Suricata tetradactyla*). Born in the Menagerie.
- 1 Red Kangaroo (*Macropus rufus*). Born in the Menagerie.
- 3 Barred Doves (*Geopelia striata*). Presented by Mrs. G. A. Thomson.
24. 1 Red Kangaroo (*Macropus rufus*), ♀. Born in the Menagerie.
25. 1 African Civet Cat (*Viverra civetta*). Presented by Capt. Webster, R.M.S. 'Hawarden Castle.'
- 1 Cape Crowned Crane (*Balearica chrysopelargus*). Presented by Sir Donald Currie, M.P., K.C.M.G.
- 1 Gold Pheasant (*Thaumalea picta*). Deposited.
27. 5 Prince of Wales' Pheasants (*Phasianus principalis*), 2 ♂, 3 ♀. Presented by Major Peacock, R.E. See P. Z. S. 1888, p. 140. From Afghan Turkestan.
- 1 Spotted Eagle-Owl (*Bubo maculosus*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
- 5 Angulated Tortoises (*Chersina angulata*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S. See P. Z. S. 1888, p. 251, pl. xiv.
- 3 Tuberculated Tortoises (*Homopus femoralis*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
- 1 Galeated Pentonyx (*Pentonyx galeata*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
- 1 Infernal Snake (*Boodon infernalis*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
- 1 Rufous Snake (*Ablabes rufulus*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
- 1 Rufescent Snake (*Leptodira rufescens*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
- 1 Spotted Slow-worm (*Acontias meleagris*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
- 5 Round-throated Frogs (*Rana fuscigula*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
- 1 Narrow-headed Toad (*Bufo angusticeps*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
- 1 Natal Sternothere (*Sternotherus castaneus*). Presented by Lieut.-Col. J. H. Bowker, F.Z.S.
28. 1 Yellow-footed Rock-Kangaroo (*Petrogale xanthopus*). Born in the Menagerie.
- 12 Black-headed Gulls (*Larus ridibundus*). Presented by J. G. Baxter, Esq.
- 1 Common Gull (*Larus canus*). Presented by J. G. Baxter, Esq.
- Mar. 1. 1 Rhesus Monkey (*Macacus rhesus*), ♀. Presented by Capt. R. F. Hibbert.
- 2 Cirl Buntings (*Emberiza cirrus*). Purchased.

- Mar. 2. 1 Indian Civet (*Viverricula malaccensis*). Presented by Percy Montgomery, Esq. From Ichang, China.
 1 Hog Deer (*Cervus porcinus*). Born in the Menagerie.
 3. 1 Common Raccoon (*Procyon lotor*). Presented by C. J. Urquhart, Esq.
 4. 1 Eland (*Oreos canna*), ♀. Born in the Menagerie.
 2 Laughing Kingfishers (*Dacelo gigantea*). Presented by Mrs. Maas Buckley.
 5. 1 Macaque Monkey (*Macacus cynomolgus*), ♀. Presented by Mrs. A. Ballard.
 6. 4 Cape Colies (*Colius capensis*). Received in Exchange.
 1 Common Quail (*Coturnix communis*). Presented by Capt. Christian.
 1 Brazilian Tortoise (*Testudo tabulata*). Deposited.
 7. 1 Binturong (*Arctictis binturong*). Presented by J. P. Rodger, Esq. From Selangore, Malay Peninsula.
 10. 1 White-fronted Capuchin (*Cebus albifrons*), ♂. Presented by Mrs. E. A. Lediard.
 13. 1 Gayal (*Bibos frontalis*). Born in the Menagerie.
 2 Stock-Doves (*Columba ænas*). Presented by Lieut.-Col. W. G. Dawkins, F.Z.S.
 20. 1 White-fronted Lemur (*Lemur albifrons*). Born in the Menagerie.
 23. 2 Banded Grass-Finches (*Poëphila cincta*). Purchased.
 2 Bichenov's Finches (*Estrelida bichenovii*). Purchased.
 24. 1 Shining Parrakeet (*Pyrrhulopsis splendens*). Purchased.
 2 Mandarin Ducks (*Æx galericulata*), ♀ ♂. Purchased.
 28. 1 Common Swan (*Cygnus olor*), ♂. Deposited.
 29. 1 Gannet (*Sula bassana*). Presented by Mrs. Richards.
 1 Greater Black-backed Gull (*Larus marinus*). Presented by Mrs. Richards.
 31. 1 Rock-hopper Penguin (*Eudyptes chrysocome*). Received in Exchange.
 1 Hawfinch (*Coccothraustes vulgaris*). Presented by Mr. Chas. Faulkner.
- Apr. 2. 1 Central-American Agouti (*Dasyprocta isthmica*). Purchased.
 1 Moorish Gecko (*Tarentola mauritanica*). Presented by J. C. Warburg, Esq.
 4. 1 Ortolan Bunting (*Emberiza hortulana*). Presented by W. H. St. Quintin, Esq., F.Z.S.
 2 Poiret's Newts (*Molge poireti*), ♂ ♀. Presented by G. A. Boulenger, Esq., F.Z.S.
 5. 2 Striped Hyænas (*Hyæna striata*). Presented by Capt. E. B. Pusey, R.N. From Algeria.
 6. 1 Greater Sulphur-crested Cockatoo (*Cacatua galerita*). Deposited.
 9. 2 Collared Fruit-Bats (*Cynonycteris collaris*). Born in the Menagerie.
 2 White-necked Crows (*Corvus scapulatus*). Presented by Capt. Henry F. Hoste, s.s. 'Trojan.'
 2 Spotted Eagle-Owls (*Bubo maculosa*). Presented by Capt. Henry F. Hoste, s.s. 'Trojan.'
10. 1 Asp Viper (*Vipera aspis*). Deposited.
 1 Muscovy Duck (*Cairina moschata*), ♂. Presented by W. Shuter, Esq.
 11. 1 Greater Vasa Parrot (*Coracopsis vasa*). Deposited.

- Apr. 12. 1 Blue-eyed Cockatoo (*Cacatua ophthalmica*). Deposited.
 1 Goffin's Cockatoo (*Cacatua goffini*). Deposited.
 4 Half-collared Doves (*Turtur semitorquatus*). Presented by Mrs. Wisely.
 1 Slow-worm (*Anguis fragilis*). Presented by Mr. F. W. Pilkington.
 1 Nicobar Pigeon (*Caloenas nicobarica*). Received in Exchange.
13. 1 Arabian Baboon (*Cynocephalus hamadryas*), ♀. Presented by D. Wilson-Barker, Esq., R.N.R., F.Z.S.
 2 Indian Swine (*Sus cristatus*), 2 ♂. Deposited.
14. 4 European Pond-Tortoises (*Emys europæa*). Purchased.
18. 1 Striped Hyæna (*Hyæna striata*). Presented by Herbert E. White, Esq. From Morocco.
19. 1 Collared Fruit-Bat (*Cynonycteris collaris*). Born in the Menagerie.
 2 Sclater's Penguins (*Eudyptes sclateri*). Presented by Capt. Sutcliff, R.M.S.S. 'Aorangi.' From the Auckland Islands. See P. Z. S. 1888, p. 265, and P. Z. S. 1889, March 6.
20. 1 Common Marmoset (*Hapale jacchus*). Presented by Mrs. Leighton.
 1 Chinchilla (*Chinchilla lanigera*). Born in the Menagerie.
 1 Barbary Wild Sheep (*Ovis tragelaphus*), ♂. Born in the Menagerie.
 1 Indian Wolf (*Canis pallipes*), ♂. Presented by Col. Alex. A. Kinloch, C.M.Z.S.
 2 Indian Desert Foxes (*Canis leucopus*). Presented by Col. Alex. A. Kinloch, C.M.Z.S. See P. Z. S. 1888, p. 265.
 1 Spotted Hawk-Eagle (*Spizaëtus nipalensis*). Presented by Col. Alex. A. Kinloch, C.M.Z.S. See P. Z. S. 1888, p. 265.
21. 1 Gannet (*Sula bassana*). Presented by Miss Serrell.
 3 Common Swans (*Cygnus olor*). Purchased.
23. 1 Bonnet-Monkey (*Macacus sinicus*), ♀. Presented by Lionel H. Hanbury, Esq., F.Z.S.
 1 Scarlet Ibis (*Eudocimus ruber*). Presented by Chas. Booth, Esq.
 1 Roseate Spoonbill (*Platalea ajaja*). Presented by Chas. Booth, Esq.
24. 1 Macaque Monkey (*Macacus cynomolgus*), ♂. Presented by Mrs. G. E. Buchanan.
25. 1 Hoffmann's Sloth (*Cholopus hoffmanni*). Received in Exchange.
 3 Lined Finches (*Spermophila lincola*), 1 ♂, 2 ♀. Purchased.
27. 2 Chinchillas (*Chinchilla lanigera*). Born in the Menagerie.
28. 1 Common Kestrel (*Tinnunculus alaudarius*). Presented by H. Weetman, Esq., F.Z.S.
29. 2 Persian Gazelles (*Gazella subgutturosa*), ♂ ♀. Born in the Menagerie.
30. 2 Black Lemurs (*Lemur macaco*). Born in the Menagerie.
 1 Asp Viper (*Vipera aspis*). Presented by Messrs. Paul & Co.
- May 1. 1 Spotted Cavy (*Cælogenys paca*). Born in the Menagerie.
 2 Japanese Deer (*Cervus sika*), 2 ♂. Purchased.
 2 Burrowing Owls (*Speotyto cunicularia*). Presented by J. Clarke Hawkshaw, Esq.
 2 Burrowing Owls (*Speotyto cunicularia*). Deposited.
 2. 1 Common Viper (*Vipera berus*). Presented by F. M. Oldham, Esq.

- May 3. 1 Macaque Monkey (*Macacus cynomolgus*), ♂. Deposited.
 2 Long-eared Bats (*Plecotus auritus*). Presented by F. A. Allchin, Esq.
 1 Blue-and-Yellow Macaw (*Ara ararauna*). Presented by Mrs. Yarrow.
 4. 2 Crested Ducks (*Anas cristata*). Presented by F. E. Cobb, Esq., C.M.Z.S. From the Falkland Islands.
 1 Vulpine Phalanger (*Phalungista vulpina*), ♂. Deposited.
 6. 1 Common Roe (*Capreolus capræa*), ♀. Presented by F. Harston Eagles, Esq. From Port Lazaref, S.E. coast of Corea.
 7. 1 Blue-and-Yellow Macaw (*Ara ararauna*). Presented by Mrs. Warrand.
 8. 2 Long-fronted Gerbilles (*Gerbillus longifrons*). Born in the Menagerie.
 1 Hog Deer (*Cervus porcinus*), ♂. Born in the Menagerie.
 9. 1 Puma (*Felis concolor*). Born in the Menagerie.
 2 Black-backed Geese (*Sarcidiornis melanonota*), ♂ ♀. Purchased.
 12. 1 Sambar Deer (*Cervus aristotelis*), ♂. Born in the Menagerie.
 2 White Ibises (*Eudocimus albus*). Purchased.
 14. 2 Peregrine Falcons (*Falco peregrinus*). Presented by J. Davison, Esq., C.S.
 1 Three-toed Chalcis (*Chalcides tridactylus*). Presented by J. C. Warburg, Esq.
 16. 7 Snricates (*Suricata tetradactyla*). Born in the Menagerie.
 1 Great Kangaroo (*Macropus giganteus*), ♂. Born in the Menagerie.
 1 Indian Python (*Python molurus*). Received in Exchange.
 17. 1 American Bison (*Bison americanus*). Born in the Menagerie.
 1 Elliot's Pheasant (*Phasianus ellioti*), ♀. Purchased.
 18. 3 Cape Crowned Cranes (*Balearica chrysopelargus*). Deposited.
 19. 1 Gannet (*Sula bassana*). Presented by Mr. Slowly.
 21. 2 Caracals (*Felis caracal*, jr.). Deposited.
 22. 1 Brazilian Tree-Porcupine (*Sphingurus prehensilis*). Presented by C. J. Bateman, Esq.
 1 Barbary Wild Sheep (*Ovis tragelaphus*), ♀. Presented by E. H. Forwood, Esq.
 1 Black-backed Piping Crow (*Gymnorhina tibicen*). Deposited.
 1 Laughing Kingfisher (*Dacelo gigantea*). Deposited.
 1 Greater Sulphur-crested Cockatoo (*Cacatua galerita*). Deposited.
 23. 1 Rhesus Monkey (*Macacus rhesus*), ♀. Presented by Mr. George Somerford.
 1 Red Kangaroo (*Macropus rufus*), ♂. Born in the Menagerie.
 1 Greater Black-backed Gull (*Larus marinus*). Presented by Prof. E. Ray Lankester, F.R.S., F.Z.S.
 6 Common Pintail (*Dafila acuta*), 3 ♂, 3 ♀. Purchased.
 8 Common Teal (*Querquedula crecca*), 4 ♂, 4 ♀. Purchased.
 8 Garganey Teal (*Querquedula circia*), 4 ♂, 4 ♀. Purchased.
 1 Shoveller (*Spatula clypeata*), ♀. Purchased.
 10 Wigeon (*Mareca penelope*), 4 ♂, 6 ♀. Purchased.
 24. 1 Chimpanzee (*Anthropopithecus troglodytes*), ♀. Presented by T. J. Alldridge, Esq., F.Z.S.
 1 Marabou Sterk (*Leptoptilus crumeniferus*). Presented by T. J. Alldridge, Esq., F.Z.S.
 1 Cape Dove (*Ena capensis*). Presented by R. H. Mitford, Esq.

- May 24. 1 Tambourine Pigeon (*Tympanistria bicolor*). Presented by R. H. Mitford, Esq.
25. 1 Barbary Ape (*Macacus inuus*), ♀. Presented by Miss Waterman.
- 3 Red-crowned Pigeons (*Erythrænas pulcherrima*). Deposited.
- 1 Praslin Parrot (*Coracopsis barklyi*). Deposited.
- 2 Slender Kestrels (*Tinnunculus gracilis*). Deposited.
26. 1 White-handed Gibbon (*Hylobates lar*). Deposited.
27. 2 Glass-Snakes (*Pseudopus pallasi*). Deposited.
- 7 Bream (*Abramis brama*). Presented by Mr. H. Goodwin.
28. 1 Nose-crested Iguana (*Iguana rhinolopha*). Presented by Dr. T. Dennehy. From St. Lucia, W. I.
- 1 Pudu Deer (*Pudua humilis*), ♀. Presented by G. E. Pugh Cook, Esq.
- 2 North-African Jackals (*Canis anthus*). Born in the Menagerie.
29. 2 Tigers (*Felis tigris*). Deposited.
- 2 Australian Waxbills (*Estrelda temporalis*). Presented by David S. Hodge, Esq.
- 7 Spotted-sided Finches (*Amadina lathamii*). Presented by David S. Hodge, Esq.
- 2 Puff Adders (*Vipera arietans*). Deposited.
30. 2 Dwarf Squirrels (*Sciurus pusillus*). Presented by R. Forrester Daly, Esq.
- 2 Japanese Deer (*Cervus sika*), 2 ♂. Born in the Menagerie.
- 1 Tent Tortoise (*Testudo tentoria*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S. From Cradock, Cape Colony.
- 1 Fisk's Tortoise (*Testudo fiski*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S. From Cradock, Cape Colony.
- 1 Dwarf Chameleon (*Chamæleon pumilus*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
- 1 Purplish Gecko (*Phyllodactylus porphyreus*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
- 1 Hoary Snake (*Coronella cana*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
- 3 Narrow-headed Toads (*Bufo angusticeps*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
- 5 Gray's Frogs (*Rana grayi*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
- 1 Blue-and-Yellow Macaw (*Ara ararauna*). Presented by Mrs. Alfred Palmer.
- 1 Long-billed Butcher Crow (*Barita destructor*). Received in Exchange.
- June 2. 1 Pallas's Sand-Grouse (*Syrrhaptes paradoxus*), ♀. From West Foulden, Berwick-on-Tweed. Presented by H. Howat Crane, Esq.
4. 1 Japanese Deer (*Cervus sika*), ♀. Born in the Menagerie.
- 2 Wandering Tree-Pies (*Dendrocitta vagabunda*). Received in Exchange.
5. 1 Chilian Skunk (*Conepatus mapurito*), ♀. Purchased.
- 5 Peafowls (*Pavo cristatus*), 2 ♂, 3 ♀. Presented by Her Majesty The Queen.
- 1 West-Australian Great Kangaroo (*Macropus ocydromus*), ♂. Received in Exchange.
- 1 Pagoda Owl (*Syrnium sinense*). Presented by C. B. Ricketts, Esq.

- June 5. 1 Horsfield's Scops Owl (*Scops lempiji*). Presented by C. B. Ricketts, Esq.
 1 White-throated Monitor (*Varanus albobularis*). Purchased.
7. 3 Grey-breasted Parrakeets (*Bolborhynchus monachus*). Presented by Mrs. Macnab.
9. 1 Burrhel Wild Sheep (*Ovis burrhel*), ♀. Born in the Menagerie.
 1 Black-necked Swan (*Cygnus nigricollis*), ♀. Purchased.
 1 Lesser Black-backed Gull (*Larus fuscus*). Presented by D. Wilson-Barker, Esq.
12. 2 Pig-tailed Monkeys (*Macacus nemestrinus*), ♂ ♀. Presented by Mr. C. W. Ellacott.
13. 2 Spotted Cavies (*Cælogenys paca*), ♂ ♀. Presented by Mr. W. H. Stather.
14. 1 Bonnet-Monkey (*Macacus sinicus*), ♀. Presented by Mr. J. Wiltshire.
16. 1 Wapiti Deer (*Cervus canadensis*), ♂. Born in the Menagerie.
 1 Pig-tailed Monkey (*Macacus nemestrinus*). Presented by Mrs. Gleig.
 1 Maugé's Dasyure (*Dasyurus maugæi*). Presented by H. R. Brane, Esq.
 2 Pallas's Sand-Grouse (*Syrhaptus paradoxus*), ♂ ♀. Presented by Lieut.-Col. Irby and Capt. Savile Reid, F.Z.S. (See P. Z. S. 1888, p. 413.) From the Island of Tiree, Argyllshire.
18. 1 Larger Hill-Mynah (*Gracula intermedia*). Presented by Mrs. M. von Kornatzki.
 2 Naked-footed Owlets (*Athene noctua*). Presented by Miss Pierce.
19. 1 Duyker-bok (*Cephalophus mergens*), ♀. Deposited.
 1 Bennett's Kangaroo (*Halmaturus bennetti*), ♀. Born in the Menagerie.
 1 Swainson's Lorikeet (*Trichoglossus novæ-hollandiæ*). Presented by Mr. H. A. Hankey.
21. 1 Macaque Monkey (*Macacus cynomolgus*). Presented by A. B. Parker, Esq.
 5 Bolle's Pigeons (*Columba bollii*). Deposited by E. G. Meade Waldo, Esq. From Teneriffe.
 1 Barbary Partridge (*Caccabis petrosa*). Deposited. From Teneriffe.
 1 Red-legged Partridge (*Caccabis rufa*). Deposited. From Grand Canary.
22. 2 Long-fronted Gerbilles (*Gerbillus longifrons*). Born in the Menagerie.
 1 Four-lined Snake (*Coluber quadrilineatus*, var. *leopardinus*). Purchased.
23. 1 Yellow-legged Herring-Gull (*Larus cachinnans*). Bred in the Menagerie.
 2 Loggerhead Ducks (*Tachyeres cinereus*). Presented by Mr. Archibald McCall. From the Falkland Islands.
25. 1 Gaimard's Rat-Kangaroo (*Hypsiprymnus gaimardi*), ♂. Deposited.
 2 Triangular-spotted Pigeons (*Columba guinea*). Bred in the Menagerie.
28. 1 Smooth Snake (*Coronella lævis*). Presented by Walter C. Blaker, Esq.
29. 1 Dark-green Snake (*Zamenis atrovirens*). Purchased.
 1 Esculapian Snake (*Coluber æsculapii*). Purchased.

- June 30. 2 Tasmanian Wolves (*Thylacinus cynocephalus*), ♂ ♀. Deposited.
 4 Bennett's Wallabies (*Halmaturus bennetti*). Deposited.
 9 Silky Bower-birds (*Ptilonorhynchus violaceus*). Deposited.
 10 Laughing Kingfishers (*Dacelo gigantea*). Deposited.
 10 Blue-cheeked Parrakeets (*Platycercus cyanogenys*). Deposited.
 2 Cereopsis Geese (*Cereopsis novæ-hollandiæ*). Deposited.
 6 Maned Geese (*Bernicla jubata*). Received in Exchange.
 2 Lace Monitors (*Varanus varius*). Received in Exchange.
 2 Gould's Monitors (*Varanus gouldi*). Received in Exchange.
 1 Black-and-Yellow Cyclodus (*Cyclodus nigroluteus*). Received in Exchange.
 2 Black-backed Piping Crows (*Gymnorhina tibicen*). Deposited.
- July 2. 1 White-thighed Colobus (*Cololus vellerosus*), ♂. Presented by H. H. Johnston, Esq., F.Z.S.
 1 Campbell's Monkey (*Cercopithecus campbelli*), ♀. Presented by H. H. Johnston, Esq., F.Z.S.
 1 White-collared Mangabey (*Cercocebus collaris*). Presented by H. H. Johnston, Esq., F.Z.S.
 1 Bosman's Potto (*Perodicticus potto*). Presented by H. H. Johnston, Esq., F.Z.S.
 1 Marabou Stork (*Leptoptilus crumeniferus*). Presented by H. Johnston, Esq., F.Z.S.
 1 Black Sternothere (*Sternotherus niger*). Presented by H. H. Johnston, Esq., F.Z.S.
 1 Patas Monkey (*Cercopithecus patas*), ♀. Deposited.
 2 West-African Love-birds (*Agapornis pullaria*). Deposited.
 2 Modest Grass-Finches (*Amadina modesta*), ♂ ♀. Purchased.
 1 Spotted Tinamou (*Nothura maculosa*). Bred in the Menagerie.
 2 Cambayan Turtle-Doves (*Turtur senegalensis*). Bred in the Menagerie.
3. 3 Chiloe Wigeon (*Mareca chiloensis*). Bred in the Menagerie.
 3 Slender Ducks (*Anas gibberifrons*). Bred in the Menagerie.
 2 Australian Wild Ducks (*Anas superciliosa*). Bred in the Menagerie.
 3 Summer Ducks (*Æx sponsa*). Bred in the Menagerie.
 3 Mandarin Ducks (*Æx galericulata*). Bred in the Menagerie.
- 11 Chilian Pintails (*Dafila spinicauda*). Bred in the Menagerie.
 1 Cormorant (*Phalacrocorax carbo*). Deposited.
4. 3 Scarlet Ibises (*Eudocimus ruber*). Deposited.
 1 Eyed Lizard (*Lucerta ocellata*). Presented by J. Hopson, Esq.
 1 Hygian Snake (*Elaps hygiæ*). Presented by — Brown, Esq., M.I.C.E.
5. 2 Black-bellied Sand-Grouse (*Pterocles arenarius*). From Marceco. Presented by Sir W. Kirby Green, K.C.M.G.
 1 Chipping Squirrel (*Tamias striatus*). Purchased.
6. 1 Moor-Monkey (*Sennopithecus maurus*), ♂. Received in Exchange.
 5 Lesser Pin-tailed Sand-Grouse (*Pterocles exustus*), 2 ♂, 3 ♀. Purchased.
 2 Common Chameleons (*Chamæleon vulgaris*). Deposited.
- 9 1 Grand Eclectus (*Eclectus roratus*). Presented by Lieut.-Col. R. Wolfe.
 1 Red-sided Eclectus (*Eclectus pectoralis*). Presented by Lieut.-Col. R. Wolfe.
 2 Hog-nosed Snakes (*Heterodon platyrhinus*). Presented by H. E. T. Glover, Esq.

- July 9. 1 Summer Snake (*Cyclophis cestivus*). Presented by H. E. T. Glover, Esq.
 2 Carolina Anolises (*Anolis carolinensis*). Presented by H. E. T. Glover, Esq.
 2 European Tree-Frogs (*Hyla arborea*). Presented by Lionel A. William, Esq.
10. 1 Brown Capuchin (*Cebus fatuellus*?). Presented by Roger M. Dodington, Esq.
 1 Tuberculated Iguana (*Iguana tuberculata*). Presented by the West-Indian Nat. Hist. Exploration Committee. From Dominica, W. I.
 2 Common Boas (*Boa constrictor*, var. *diviniloqua*). Presented by the West-Indian Nat. Hist. Exploration Committee. From Dominica, W. I.
 1 Black-and-White Snake (*Dromicus leucomelas*). Presented by the West-Indian Nat. Hist. Exploration Committee. From Dominica, W. I.
11. 1 Varied Capuchin (*Cebus versicolor*). Presented by H. B. Whitmarsh, Esq.
 2 Ruffed Lemurs (*Lemur varius*), ♂ ♀. Deposited.
 3 Red-and-Blue Macaws (*Ara macao*). Deposited.
 1 Hyacinthine Macaw (*Ara hyacinthina*). Deposited.
 4 Spotted Tinamous (*Nothura maculosa*). Deposited.
12. 1 Macaque Monkey (*Macacus cynomolgus*), ♂. Presented by Miss Chester.
 1 Mona Monkey (*Cercopithecus mona*), ♀. Presented by Miss Edith Frank.
 2 Mule Deer (*Cariacus macrotis*), ♂ ♀. Born in the Menagerie.
 1 Green Turtle (*Chelone viridis*). Presented by Baron Henry de Worms, M.P., F.Z.S.
14. 2 Corn-Crakes (*Crex pratensis*). Presented by Mr. R. B. Spalding.
16. 1 Green Monkey (*Cercopithecus callitrichus*), ♀. Presented by Mrs. Holden.
 1 Grey Parrot (*Psittacus erithacus*, white var.). Deposited.
17. 2 Californian Quails (*Callipepla californica*), 2 ♂. Presented by Mrs. Fanny Lloyd.
 2 Æsculapian Snakes (*Coluber æsculapii*). Presented by P. L. Sclater, Esq., F.R.S. From Germany.
20. 1 Rhesus Monkey (*Macacus rhesus*), ♂. Presented by Herbert C. Oates, Esq.
 1 Tabuan Parrakeet (*Pyrrhulopsis tabuensis*). Deposited.
 7 Slender-fingered Frogs (*Leptodactylus pentadactylus*). Presented by Dr. H. A. A. Nicholls. From Dominica.
21. 2 American Black Bears (*Ursus americanus*), ♂ ♀. Deposited.
22. 1 Lesser Kestrel (*Tinnunculus cenchris*). Presented by H. Hanauer, Esq., F.Z.S.
23. 2 Mule Deer (*Cariacus macrotis*), ♂ ♀. Born in the Menagerie.
 1 Black-marked Snake (*Pituophis vertebralis*). Presented by Mr. Jeremiah Garnett.
 6 Martinican Tree-Frogs (*Hylodes martinicensis*). Presented by Capt. Woolward, R.M.S. 'Don.'
 1 Derbian Screamer (*Chauna derbiana*). Purchased.
24. 1 Green Turtle (*Chelone viridis*). Presented by Baron Henry de Worms.
 1 Hawk's-billed Turtle (*Chelone imbricata*). Presented by W. T. Manger, Esq.
 2 Rose-coloured Pastors (*Pastor roseus*). Received in Exchange.

- July 24. 4 Beautiful Grass-Finches (*Poëphila mirabilis*). Purchased.
 4 Gouldian Grass-Finches (*Poëphila gouldiæ*). Purchased.
 1 Canadian Beaver (*Castor canadensis*). Born in the Menagerie.
 1 Thar (*Capra jemliaca*). Born in the Menagerie.
 1 Brazilian Cariama (*Cariama cristata*). Bred in the Gardens.
25. 1 Crested Grebe (*Podiceps cristatus*). Presented by W. Nicholls, Esq.
 2 Collared Fruit-Bats (*Cynonycteris collaris*). Born in the Menagerie.
26. 1 Prince Albert's Curassow (*Crax alberti*), ♀. Purchased.
 1 Virginian Fox (*Canis virginianus*), ♀. Received in Exchange.
27. 1 Brazilian Cariama (*Cariama cristata*). Presented by Fredk. Rose, Esq., jun.
 1 Common Viper (*Vipera berus*). Presented by F. C. Smith, Esq.
 1 Feline Douroucouli (*Nyctipithecus vociferans*), ♀. Presented by Master Lester Ralph.
29. 1 Indian Kite (*Milvus govinda*). Presented by Mrs. Dean.
30. 1 Purple-faced Monkey (*Semnopithecus leucoprymnus*), ♀. Presented by Martin J. Cole, Esq.
 1 Chipping Squirrel (*Tamias striatus*). Presented by Mrs. Matveieff.
 1 Tayra (*Galictis barbara*), ♂. Presented by Mrs. J. H. Pollard.
 1 Common Boa (*Boa constrictor*). Deposited.
 1 Æsculapian Snake (*Coluber æsculapii*). Deposited.
 3 Black-eared Marmosets (*Hapale penicillata*). Presented by Mr. J. A. Deintje.
- Aug. 1. 1 Smooth Snake (*Coronella levis*). Presented by E. G. Meade-Waldo, Esq.
 2. 1 Common Squirrel (*Sciurus vulgaris*). Presented by R. Grant Watson, Esq.
 1 Common Kestrel (*Tinnunculus alaudarius*). Presented by W. A. W. Jones, Esq.
 3. 1 Rhesus Monkey (*Macacus rhesus*), ♂. Presented by Reginald S. Knott, Esq.
 1 Rhesus Monkey (*Macacus rhesus*), ♂. Deposited.
 1 Lesser Sulphur-crested Cockatoo (*Cacatua sulphurea*). Presented by J. Wolfe Barry, Esq.
 1 White-backed Piping Crow (*Gymnorhina leuconota*). Presented by Miss Alice Rutherford.
 1 Herring-Gull (*Larus argentatus*). Presented by Mrs. Huthwaite.
 1 Laughing Gull (*Larus atricilla*). Presented by Dr. A. Boon, F.R.C.S., C.M.Z.S. From St. Kitts, W.I.
 1 Green Bittern (*Butorides virescens*). Presented by Dr. A. Boon, F.R.C.S., C.M.Z.S. From St. Kitts, W.I.
7. 1 Ocelot (*Felis pardalis*). Deposited.
 1 Orange-winged Amazon (*Chrysotis amazonica*). Presented by the Hon. N. L. Melville.
 2 Fulmars (*Fulmarus glacialis*). Presented by W. C. Gilles, Esq. From St. Kilda.
 2 European Tree-Frogs (*Hyla arborea*). Deposited.
8. 1 Capuchin (*Cebus, sp. inc.*), ♂. Presented by Mr. Haddon.
 2 Common Genets (*Genetta vulgaris*). Presented by Philip Lemberg, Esq.
 1 Barraband's Parrakeet (*Polytelis barrabandi*). Purchased.

- Aug. 8. 1 Ring-necked Parrakeet (*Palæornis torquatus*). Deposited.
 1 Grey-breasted Parrakeet (*Bolborhynchus monachus*). Deposited.
 1 Mountain Ka-ka (*Nestor notabilis*). Received in Exchange.
9. 1 Macaque Monkey (*Macacus cynomolgus*), ♂. Deposited.
 3 Palm-Squirrels (*Sciurus palmarum*). Presented by Surg.-Major W. G. King.
10. 3 Gold Pheasants (*Thaumalea picta*). Bred in the Menagerie.
 1 Common Chameleon (*Chamaeleon vulgaris*). Presented by Mr. Underwood.
11. 2 White-fronted Amazons (*Chrysotis leucocephala*). Deposited.
 1 Common Rhea (*Rhea americana*). Deposited.
12. 2 Canadian Beavers (*Castor canadensis*). Bred in the Menagerie.
14. 1 Bonnet-Monkey (*Macacus sinicus*), ♀. Presented by Wm. Norman, Esq.
 1 Tiger (*Felis tigris*), ♂. Presented by Sir E. C. Buck, C.M.Z.S.
 6 Guinea Pigs (*Cavia porcellus*, var.). Presented by R. F. Bennett, Esq.
15. 1 Lesser White-nosed Monkey (*Cercopithecus petaurista*), ♂. Presented by W. Brandford Griffith, Esq.
 1 Black-backed Piping Crow (*Gymnorhina tibicen*). Presented by Charles Clifton, Esq., F.Z.S.
 1 Common Magpie (*Pica rustica*). Presented by Charles Clifton, Esq., F.Z.S.
 2 Himalayan Monauls (*Lophophorus impeyanus*), 2 ♂. Presented by Charles Clifton, Esq., F.Z.S.
 2 Gold Pheasants (*Thaumalea picta*), ♂ ♀. Presented by Charles Clifton, Esq., F.Z.S.
 2 Silver Pheasants (*Euplocamus nyctemerus*). Presented by Charles Clifton, Esq., F.Z.S.
 1 Javan Peafowl (*Pavo spicifer*), ♂. Presented by Chas. Clifton, Esq., F.Z.S.
 2 Common Peafowl (*Pavo cristatus*), ♂ ♀. Presented by Chas. Clifton, Esq., F.Z.S.
 1 Rose-crested Cockatoo (*Cacatua moluccensis*). Presented by Chas. Clifton, Esq., F.Z.S.
 2 Leadbeater's Cockatoos (*Cacatua leadbeateri*). Presented by Chas. Clifton, Esq., F.Z.S.
 1 Hyacinthine Macaw (*Ara hyacinthina*). Presented by Chas. Clifton, Esq., F.Z.S.
 1 Blue-and-Yellow Macaw (*Ara ararauna*). Presented by Chas. Clifton, Esq., F.Z.S.
 1 Great Eagle-Owl (*Bubo maximus*). Presented by Chas. Clifton, Esq., F.Z.S.
 4 Common Herons (*Ardea cinerea*). Presented by Chas. Clifton, Esq., F.Z.S.
 2 Mandarin Ducks (*Aix galericulata*). Presented by Chas. Clifton, Esq., F.Z.S.
 2 Rose Hill-Parrakeets (*Platycercus eximius*). Purchased.
16. 1 Bengalese Cat (*Felis bengalensis*). Presented by W. L. Selater, Esq., F.Z.S.
 1 Common Kiugfisher (*Alcedo ispida*). Presented by E. Hart, Esq., F.Z.S.
17. 1 Bare-eyed Cockatoo (*Cacatua gymnopsis*). Presented by Mrs. Fishlock.
 1 New-Zealand Parrakeet (*Cyanorhamphus novæ-zealandiæ*). Purchased.

- Aug. 17. 2 American Box-Tortoises (*Terrapene carinata*). Presented by Prof. O. C. Marsh.
 2 Alligator Terrapins (*Chelydra serpentina*). Presented by Prof. O. C. Marsh.
 1 Speckled Terrapin (*Clemmys guttata*). Presented by Prof. O. C. Marsh.
 4 Sculptured Terrapins (*Clemmys insculpta*). Presented by Prof. O. C. Marsh.
18. 2 Chinchillas (*Chinchilla lanigera*). Born in the Menagerie.
 1 Imperial Eagle (*Aquila imperialis*). Presented by Mrs. Ernest H. Forwood. From Morocco.
 1 Horned Lizard (*Phrynosoma cornutum*). Presented by Master Howard Sexton.
20. 1 Macaque Monkey (*Macacus cynomolgus*), ♂. Deposited.
 5 Brazilian Teal (*Querquedula brasiliensis*). Bred in the Menagerie.
 2 Chilean Pintail (*Dafila spinicauda*). Born in the Menagerie.
21. 2 Great White Herons (*Ardea alba*). Purchased.
 1 Razorbill (*Alca torda*). Presented by T. H. Nelson, Esq.
 1 Moor-Monkey (*Semnopithecus maurus*). Received in Exchange.
 1 Malabar Squirrel (*Sciurus maximus*). Received in Exchange.
 1 River Jack-Viper (*Vipera rhinoceros*). Received in Exchange.
22. 1 Lesser White-nosed Monkey (*Cercopithecus petaurista*), ♀. Deposited.
 1 Nightingale (*Daulius lusciniæ*), ♂. Presented by J. Young, Esq.
 1 American Wild Turkey (*Meleagris gallopavo*), ♂. Presented by F. J. Coleridge Boles, Esq.
23. 1 Ring-tailed Coati (*Nasua rufa*). Presented by Capt. James Smith.
 1 Sclater's Curassow (*Crax sclateri*), ♀. Received in Exchange.
 1 Red-bellied Squirrel (*Sciurus variegatus*). Received in Exchange.
24. 3 Black-headed Lemurs (*Lemur brunneus*). Presented by Capt. J. Bonneville.
 1 Vulpine Squirrel (*Sciurus vulpinus*), ♂. Deposited.
 2 Triangular-spotted Pigeons (*Columba guinea*). Born in the Menagerie.
 3 Chinese Blue Magpies (*Cyanopoliis cyanus*). Hatched in the Menagerie.
 2 Pallas's Sand-Grouse (*Syrrhaptes paradoxus*), 2 ♀. Presented by Alexander Speedie, Esq. From Fifeshire, N.B.
25. 1 Wapiti Deer (*Cervus canadensis*), ♂. Born in the Menagerie.
 1 Raven (*Corvus corax*). Presented by F. Steinhoff, Esq.
28. 1 Brown Bear (*Ursus arctos*), ♂. Deposited.
 1 White-backed Piping Crow (*Gymnorhina leuconota*). Deposited.
 4 Oyster-catchers (*Himantopus ostralegus*). Purchased.
 1 Avocet (*Recurvirostra avocetta*). Presented by Mr. J. Hoogerduyn.
 1 Small Hill-Mynah (*Gracula religiosa*). Presented by Alex. Robertson, Esq.
29. 2 Sallé's Amazons (*Chrysotis salléi*). Purchased.
31. 1 Common Sheldrake (*Tadorna vulpanser*), ♀. Presented by the Rev. H. H. Slater.

- Aug. 31. 12 Mandarin Ducks (*Aix galericulata*), 6 ♂, 6 ♀. Deposited.
 2 Common Chameleons (*Chamaeleon vulgaris*). Presented by J. Alfred Lockwood.
- Sept. 3. 1 Alligator (*Alligator mississippiensis*). Presented by Michael Millard, Esq.
4. 1 Roseate Cockatoo (*Cacatua roseicapilla*). Presented by Mrs. J. de la Mare.
 1 Sulphur-and-White-breasted Toucan (*Rhamphastos vitellinus*). Presented by Dr. C. E. Lister.
5. 1 Squirrel-Monkey (*Chrysothrix sciurea*). Presented by Mr. Geo. Miles.
 1 Kinkajou (*Cercoleptes caudivolvulus*). Presented by Dr. A. Batchelor, F.R.C.P.
 1 Black-backed Jackal (*Canis mesomelas*), ♀. Presented by Lieut. Lionel de Lantour Wells, R.N.
6. 2 Sharp-nosed Crocodiles (*Crocodilus acutus*). Presented by Mr. E. A. Williams.
 1 Rhesus Monkey (*Macacus rhesus*), ♀. Presented by J. Witham, Esq.
 1 Common Viper (*Vipera berus*). Presented by Col. C. S. Sturt.
 1 Barbary Wild Sheep (*Ovis tragelaphus*), ♀. Deposited.
7. 1 Grey Lemur (*Haplorhina griseus*). Received in Exchange.
 1 Brazilian Cariama (*Cariama cristata*). Bred in the Menagerie.
8. 1 Short-eared Owl (*Asio brachyotus*). Presented by Miss Ethel Cobb. From the Falkland Islands.
10. 2 Central-American Agoutis (*Dasyprocta isthmica*). Purchased.
 1 Prince Albert's Curassow (*Crax alberti*), ♂. Purchased.
 1 Mexican Guan (*Penelope purpurascens*). Purchased.
11. 2 White-fronted Amazons (*Chrysotis leucocephala*). Purchased.
 3 Lacertine Snakes (*Colepeltis lacertina*). Presented by H. E. White, Esq.
 2 Horseshoe Snakes (*Zamensis hippocrepis*). Presented by H. E. White, Esq.
 2 Chameleons (*Chamaeleon vulgaris*). Presented by H. E. White, Esq.
12. 1 Tuberculated Iguana (*Iguana tuberculata*, jr.). Presented by H. E. Blandford, Esq.
13. 1 Herring-Gull (*Larus argentatus*). Presented by the Marchioness of Cholmondeley.
 1 White-backed Piping Crow (*Gymnorhina leucanota*). Presented by R. Hall, Esq.
14. 1 Large Hill-Mynah (*Gracula intermedia*). Presented by Lieut.-Col. Robt. Thompson.
17. 1 Ourang-outang (*Simia satyrus*), ♀. Deposited.
 1 Ruffed Lemur (*Lemur varius*). Deposited.
 2 Brush-tailed Kangaroos (*Petrogale penicillata*), ♂ ♀. Purchased.
 1 Chinese Goose (*Anser cygnoides*), ♀. Received in Exchange.
18. 1 Capuchin (*Cebus*, sp. inc.), ♀. Purchased.
 2 Vulpine Phalangists (*Phalangista vulpina*), 2 ♀. Presented by J. M. Kirby, Esq.
19. 1 Large Hill-Mynah (*Gracula intermedia*). Deposited.
 1 Common Teal (*Querquedula crecca*), ♀. Presented by Mrs. Bergman.
 1 European Pond-Tortoise (*Emys europæa*). Presented by Master William Reed.

- Sept. 20. 6 Robben-Island Snakes (*Coronella phocarum*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
21. 1 Suricate (*Suricata tetradactyla*). Presented by Lieut. Lionel de Lantour Wells, R.N.
24. 1 Grivet Monkey (*Cercopithecus griseo-viridis*), ♂. Presented by Lord Archibald Campbell.
- 1 Weka Rail (*Ocydromus australis*). Presented by Mr. H. Lindsay.
25. 1 Rose-crested Cockatoo (*Cacatua moluccensis*). Presented by Miss Eve.
- 1 Puffin (*Fratercula arctica*). Presented by J. M. Drew, Esq., F.Z.S.
- 1 Common Snake (*Tropidonotus natrix*). Presented by P. S. Hutchinson, Esq.
- 1 Common Slow-worm (*Anguis fragilis*). Presented by P. S. Hutchinson, Esq.
26. 1 Rhesus Monkey (*Macacus rhesus*), ♀. Presented by Major Dudley Buckle, R.A.
- 1 Bonnet-Monkey (*Macacus sinicus*), ♂. Presented by Mr. G. C. Gosling.
- 1 Canadian Beaver (*Castor canadensis*). Born in the Menagerie.
- 4 Chilian Pintail (*Dafile spinicauda*). Bred in the Menagerie.
- 1 Common Viper (*Vipera berus*). Presented by Mr. A. H. N. Smith.
27. 2 Sooty Mangabey Monkeys (*Cercocebus fuliginosus*), 2 ♀. Presented by Mr. Edward Felton, R.E.
- 1 Ocelot (*Felis pardalis*), ♂. Presented by E. Percy Bates, Esq.
28. 2 Collared Fruit-Bats (*Cynonycteris collaris*). Born in the Menagerie.
29. 2 Grivet Monkeys (*Cercopithecus griseo-viridis*), ♂ ♀. Deposited.
- 1 Axis Deer (*Cervus axis*), ♂. Born in the Menagerie.
- 4 European Tree-Frogs (*Hyla arborea*). Presented by Lionel A. Williams, Esq.
- 1 White-backed Trumpeter (*Psophia leucoptera*). Received in Exchange.
- Oct. 1. 1 Common Marmoset (*Hapale jacchus*). Presented by Miss Maud Bryden.
- 1 Laughing Kingfisher (*Dacelo gigantea*). Deposited.
2. 1 Rhesus Monkey (*Macacus rhesus*), ♀. Presented by Miss Jessie Bone.
- 1 Drill Baboon (*Cynocephalus leucophæus*), ♀. Presented by the Rev. C. H. Richardson.
- 1 Patas Monkey (*Cercopithecus patas*), ♀. Presented by Master Lewis Levy.
- 2 West-African Love-birds (*Agapornis pullaria*). Presented by Miss Ethel Levy.
3. 1 Grey Ichneumon (*Herpestes griseus*), ♀. Presented by A. Creser, Esq.
- 1 Salt-water Terrapin (*Clemmys terrapin*). Presented by Nicholas Fenwick Hele, Esq.
4. 1 Ring-tailed Coati (*Nasua rufa*), ♀. Presented by Mr. Robert Sentenally.
5. 4 Blue-bearded Jays (*Cyanocorax cyanopogon*). Purchased.
- 1 Violaceous Night-Heron (*Nycticorax violaceus*). Purchased.
6. 1 Grey Ichneumon (*Herpestes griseus*), ♂. Presented by Miss A. Rutherford.

- Oct. 8. 4 Esquimaux Dogs (*Canis familiaris*, var.). Born in the Menagerie.
 1 Brazilian Hangnest (*Icterus jamaicai*). Presented by T. R. Tufnell, Esq.
9. 1 Gazelle (*Gazella dorcas*), ♀. Presented by Mrs. Eugenio Arbib.
 1 Alexandrine Parrakeet (*Palæornis alexandri*). Purchased.
10. 1 Rhesus Monkey (*Macacus rhesus*), ♂. Presented by Miss Kate Marion Pope.
 2 Alpacas (*Lama pacos*). Deposited.
 5 Bare-necked Francolins (*Francolinus nudicollis*), 2 ♂, 3 ♀. Presented by Capt. Larmer.
 2 Slow-worms (*Anguis fragilis*). Presented by Mr. Cecil L. Nicholson.
11. 1 Bennett's Wallaby (*Halmaturus bennetti*), ♀. Born in the Menagerie.
 1 Æsculapian Snake (*Coluber æsculapii*). Hatched in the Menagerie.
12. 1 Vulpine Phalanger (*Phalangista vulpina*), ♀. Born in the Menagerie.
 1 Laughing Kingfisher (*Dacelo gigantea*). Presented by H. Butler, Esq.
 2 Upland Geese (*Bernicla magellanica*), ♂ ♀. Deposited.
 3 Crested Pelicans (*Pelecanus crispus*), jr. Deposited.
 1 Macaque Monkey (*Macacus cynomolgus*). Presented by Miss Felix Smith.
13. 1 Brush-tailed Kangaroo (*Petrogale penicillata*), ♂. Presented by Capt. Philp.
 1 Cape Crowned Crane (*Balcarica chrysopelargus*). Deposited.
 1 Laughing Kingfisher (*Dacelo gigantea*). Presented by Capt. Philp.
15. 1 Common Otter (*Lutra vulgaris*), ♀. Presented by J. Crisp, Esq.
 1 Nilotic Trionyx (*Trionyx niloticus*). Received in Exchange.
16. 2 Toque Monkeys (*Macacus pileatus*), ♂ ♀. Presented by Mrs. Ellen Hodson.
 1 Moustache Monkey (*Cercopithecus cephus*), ♂. Presented by Andrew Allen, Esq.
 1 Grey Ichneumon (*Herpestes griseus*). Deposited.
 4 Snow-Geese (*Chen albatus*). Deposited.
17. 1 White-collared Mangabey (*Cercocebus collaris*), ♂. Presented by A. Dunn, Esq.
 2 Cockateels (*Culopsitta novæ-hollandiæ*), ♂ ♀. Deposited.
 1 Triangular-spotted Pigeon (*Columba guinea*). Bred in the Menagerie.
 2 Cambayan Turtle-Doves (*Turtur senegalensis*). Bred in the Menagerie.
18. 1 Indian Wild Swine (*Sus cristatus*), ♂. Received in Exchange.
 1 Japanese Deer (*Cervus sika*), ♂. Presented by Capt. H. C. Eagles, R.M.L.I. From Corea.
20. 3 Virginian Opossums (*Didelphys virginianus*). Presented by G. F. Whately, Esq., R.N.
 1 Larger Hill-Mynah (*Gracula intermedia*). Deposited.
 4 Radiated Tortoises (*Testudo radiata*). Purchased.
 1 Common Chameleon (*Chamæleon vulgaris*). Presented by G. Berry, Esq.

- Oct. 21. 1 Long-nosed Crocodile (*Crocodylus cataphractus*). Received in Exchange.
22. 1 Ruffed Lemur (*Lemur varius*). Deposited.
1 Starred Tortoise (*Testudo stellata*). Presented by Mr. William Ford.
1 Alligator (*Alligator mississippiensis*). Presented by G. A. Ruck, Esq.
1 Little Grebe (*Tachybates fluviatilis*). Presented by Mr. Bibby.
23. 1 Common Seal (*Phoca vitulina*). Presented by Geo. Stevenson, Esq.
1 Red-crested Pochard (*Fuligula rufina*), ♂. Purchased.
24. 1 Malbrouck Monkey (*Cercopithecus cynosurus*), ♀. Deposited.
3 Red Deer (*Cervus elaphus*), 1 ♂, 2 ♀. Deposited.
25. 1 Macaque Monkey (*Macacus cynomolgus*), ♂. Deposited.
1 Large Hill-Mynah (*Gracula intermedia*). Deposited.
26. 2 White-tailed Gnus (*Connochates gnu*), ♂ ♀. Deposited.
1 Tawny Owl (*Syrnium aluco*). Presented by Mr. J. Weston.
27. 1 Puff Adder (*Vipera arietans*). Presented by Herbert E. White, Esq. From Marocco.
1 African Cobra (*Naia haje*). Presented by Herbert E. White, Esq. From Marocco.
29. 1 Polar Bear (*Ursus maritimus*). Deposited.
1 Blue Jay (*Cyanocitta cristata*). Purchased.
30. 1 Bonnet-Monkey (*Macacus sinicus*), ♀. Presented by Miss D. Hughes.
1 Indian Fox (*Canis*, sp. inc.). Presented by Col. Sir Oliver B. C. St. John, K.C.S.I., F.Z.S. From Mysore.
2 Hobbies (*Falco subbuteo*). Presented by Mons. P. A. Pichot.
2 Edible Frogs (*Rana esculenta*, var. *ridibunda*). Deposited.
31. 1 Axis Deer (*Cervus axis*), ♀. Presented by Capt. W. Miller.
1 Crested Pigeon (*Ocyphaps lophotes*). Bred in the Gardens.
1 Bolle's Pigeon (*Columba bollii*). Bred in the Gardens.
1 Peregrine Falcon (*Falco peregrinus*). Presented by Capt. J. Smith.
1 Egyptian Vulture (*Neophron percnopterus*). Presented by Capt. A. Kent.
- Nov. 1. 1 Knot (*Tringa canutus*). Presented by Chas. Whympere, Esq., F.Z.S.
2. 1 Ruffed Lemur (*Lemur varius*). Deposited.
3. 1 Yak (*Poëphagus grunniens*), ♀. Deposited.
1 Pallas's Sand-Grouse (*Syrrhaptes paradoxus*), ♀. Presented by John Duncan, Esq. From Fifeshire, N.B.
1 Vervet Monkey (*Cercopithecus lalandii*), ♂. Presented by Miss Helena Blow.
1 Common Genet (*Genetta vulgaris*). Presented by Lord Lilford, F.Z.S.
6. 1 Petz's Conure (*Comurus petzi*). Deposited.
2 White-tailed Eagles (*Haliaeetus albicilla*). Presented by R. H. Venables Kyrke, Esq.
4 Knots (*Tringa canutus*). Purchased.
7. 2 Short-eared Owls (*Otus brachyotus*). Presented by Capt. John Marr.
9. 1 Little Grebe (*Tachybates fluviatilis*). Presented by Mr. Howard Bunn.
10. 2 Spotted Ichneumons (*Herpestes nipalensis*). Presented by W. L. Slater, Esq., F.Z.S.

- Nov. 10. 1 Small-clawed Otter (*Lutra leptonyx*). Presented by W. L. Sclater, Esq., F.Z.S. See P. Z. S. 1888, p. 564.
 1 Slavonian Grebe (*Podiceps auritus*). Deposited.
12. 1 Spotted Salamander (*Salamandra maculosa*). Presented by F. C. S. Roper, Esq., F.Z.S.
 1 Chameleon (*Chamaeleon vulgaris*). Deposited.
13. 1 Peregrine Falcon (*Falco peregrinus*). Presented by R. H. Armstrong, Esq.
 2 American Bitterns (*Botaurus lentiginosus*). Presented by J. B. Williams, Esq.
 2 Common Swans (*Cygnus olor*), 2 ♀. Deposited.
15. 1 Indian Antelope (*Antelope cervicapra*), ♂. Presented by J. W. Shand-Harvey, Esq., J.P.
16. 1 Samango Monkey (*Cercopithecus samango*). Presented by L. B. Lewis, Esq. See P. Z. S. 1888, p. 564.
 1 Himalayan Bear (*Ursus tibetanus*), ♀. Presented by H. S. Naylor-Leyland, Esq., Lieut. 2nd Life-Guards.
 1 Axis Deer (*Cervus axis*), ♀. Presented by Lady Donaldson.
 1 Roseate Cockatoo (*Cacatua roseicapilla*). Presented by Mrs. Wond.
17. 2 Golden Plovers (*Charadrius pluvialis*). Purchased.
 1 Royal Python (*Python regius*). Deposited.
19. 1 Black-eared Marmoset (*Hapale penicillata*). Presented by Miss B. Pollock.
 1 Tawny Owl (*Syrnium aluco*). Deposited.
22. 1 Malbrouck Monkey (*Cercopithecus cynosurus*), ♂. Presented by Miss Hilda Baumann.
 1 Californian Toad (*Bufo boreas*). Presented by D. E. Cardinall, Esq.
24. 1 American Wild Turkey (*Meleagris gallopavo*), ♀. Presented by F. J. Coleridge Boles, Esq.
26. 2 Squirrel-Monkeys (*Chrysothrix sciurea*). Presented by Master H. B. Young.
 1 Raven (*Corvus corax*). Presented by Mr. C. Petrzywalski.
 1 Sparrow-Hawk (*Accipiter nisus*). Presented by Mr. G. Skegg.
 1 Blue-cheeked Barbet (*Megalæma asiatica*). Purchased.
 1 Golden-crowned Conure (*Conurus aureus*). Purchased.
 1 Golden-winged Parrakeet (*Brotogeris chrysopterus*). Purchased.
27. 1 Silvery Gibbon (*Hyllobates leuciscus*), ♂. Presented by Capt. D. L. Delacherios. From Burmah.
28. 1 Lion Marmoset (*Midas rosalia*). Deposited.
29. 1 Common Polecat (*Mustela putorius*). Presented by F. D. Lea Smith, Esq., F.Z.S.
 2 Common Barn-Owls (*Strix flammea*). Presented by E. Hart, Esq., F.Z.S.
30. 1 Pig-tailed Monkey (*Macacus nemestrinus*), ♀. Presented by W. Merryweather, Esq.
- Dec. 3. 3 Dwarf Chameleons (*Chamaeleon pumilus*). Deposited.
 1 Black Salamander (*Salamandra atra*). Presented by G. A. Boulenger, Esq., F.Z.S.
4. 1 Hawk's-billed Turtle (*Chelone imbricata*). Presented by Capt. J. Sommer.
 1 Indian Crocodile (*Crocodilus palustris*). Presented by Capt. J. Sommer.
 2 Philippine Paradoxures (*Paradoxurus philippensis*). Presented by Mr. Geo. P. Ogg.
5. 1 Meyer's Parrot (*Psecephalus meyeri*). Presented by Hugh Exton, Esq., M.D., F.G.S.

- Dec. 5. 2 Common Quails (*Coturnix communis*). Presented by W. H. St. Quintin, Esq., F.Z.S.
6. 1 Bald-headed Chimpanzee (*Anthropopithecus calvus*), ♀. Purchased. See Nature, xxxix. p. 254 (1889), and P. Z. S. 1839.
- 1 Molucca Deer (*Cervus moluccensis*). Born in the Menagerie.
- 1 Common Guillemot (*Lomvia troile*). Presented by E. Hart, Esq., F.Z.S.
7. 1 Brazilian Tapir (*Tapirus americanus*), ♂. Presented by Anthony Taaffe, Esq. From the Province of Paraná, S. Brazil.
- 1 Moorish Gecko (*Tarentola mauritanica*). Presented by J. C. Warburg, Esq.
8. 1 Long-fronted Gerbille (*Gerbillus longifrons*), ♀. Presented by Lionel Hanbury, Esq.
11. 1 Australian Cassowary (*Casuarius australis*). Deposited.
- 5 Moorish Geckos (*Tarentola mauritanica*). Presented by J. C. Warburg, Esq.
12. 3 Barbary Turtle-Doves (*Turtur risorius*). Deposited.
- 1 Nankeen Kestrel (*Tinnunculus cenchroides*). Presented by A. J. Wilkins, Esq.
- 8 Wild Geese (*Anser cinereus*). Presented by E. S. Cameron, Esq.
- 1 White-fronted Goose (*Anser albifrons*). Presented by E. S. Cameron, Esq.
- 1 Herring-Gull (*Larus argentatus*). Presented by E. S. Cameron, Esq.
- 3 Black Tortoises (*Testudo carbonaria*). Presented by Leonard Cooper, Esq. From Matto Grosso, S. Brazil.
13. 1 European Hawk-Owl (*Surnia ulula*). Presented by Lord Lilford, F.Z.S. From Russian Finland.
14. 2 Galeated Pentonyces (*Pelomedusa galeata*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
- 6 Robben-Island Snakes (*Coronella phocarum*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
15. 1 White Stork (*Ciconia alba*). Deposited.
17. 1 Yellow-footed Rock-Kangaroo (*Petrogale xanthopus*), ♂. Born in the Menagerie.
- 3 Common Partridges (*Perdix cinerea*). Presented by the Rev. F. T. Scott.
19. 1 Egyptian Cat (*Felis chaus*). Deposited.
- 1 Common Paradoxure (*Paradoxurus typus*). Deposited.
21. 1 Blue-fronted Amazon (*Chrysotis æstiva*). Presented by Miss Hayes.
- 2 Moorish Geckos (*Tarentola mauritanica*). Presented by Masters F. and O. Warburg.
22. 1 Ring-tailed Coati (*Nasua rufa*). Presented by J. W. Bell, Esq.
- 2 Long-tailed Japanese Fowls (*Gallus domesticus*, var.). Deposited.
24. 1 Prevost's Squirrel (*Sciurus prevosti*). Purchased.
- 1 Pyxis Tortoise (*Pyxis arachnoides*). Presented by Col. J. H. Bowker, F.Z.S. From Durban, Natal.
25. 1 Common Kestrel (*Tinnunculus alaudarius*). Presented by Mr. Thomas Austin.
28. 2 Concave-casqued Hornbills (*Dichoceros bicornis*). Deposited.
- 2 Ceylonese Hanging Parrakeets (*Loriculus asiaticus*), ♂ ♀. Purchased.
29. 1 Rat-tailed Snake or Fer de Lance (*Trionocephalus lanceolatus*). Presented by the West Indian (Nat. Hist.) Exploration Committee.
31. 4 Ruffs (*Machetes pugnax*). Purchased.